



THE IMPACT OF POWERPOINT USE ON TEACHER SENSE OF EFFICACY

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ABSTRACT

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The use of PowerPoint is widespread in classroom teaching, yet no studies exist that investigate how its use affects teacher sense of efficacy. Teacher sense of efficacy, understood as the teachers' judgment of their capability to make differences in students' learning, affects the effort teachers invest in teaching, the goals they set, and their level of aspiration. It has been found that highly efficacious teachers use a variety of teaching strategies and are more willing to integrate new technologies in their teaching practices. As the number of teachers who use presentation tools in their classroom increases, it would be valuable to know whether and how their use affects teacher sense of efficacy. This study expands the current literature on teacher sense of efficacy by investigating how the use of PowerPoint in the classroom relates to the construct. In order to measure whether PowerPoint use affects teacher sense of efficacy, we developed a self-administered questionnaire based on the Ohio State Teacher Efficacy Scale (OSTES) and adapted it to measure the effect of PowerPoint use in teacher efficacy. Twenty five in-service teachers who use PowerPoint quite often in their practices participated in this study. The results show that PowerPoint use has a general positive impact on teacher sense of efficacy.

Contribution/ Originality: This study contributes in the existing literature by investigating the relationship between use of PowerPoint in the classroom and teacher sense of efficacy. The results indicate that PowerPoint use has a general positive impact on teacher sense of efficacy.

1. INTRODUCTION

In recent years there has been a growing body of research on teacher sense of efficacy as an important factor underlying teaching and learning, yet little attention has been paid to how teachers' sense of efficacy is influenced by the use of Information and Communication Technology (ICT). While varying in formats, features, and content, ICT integration has been found to transform the teaching process by providing new tools and incorporating resources into teaching practices. As more and more classrooms are becoming equipped with computers, overhead projectors and interactive whiteboards, the use of presentation software like PowerPoint tends to become the norm

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in teaching, and the ability to use it effectively has evolved to one of the basic skills of teaching. Numerous studies have examined whether and how the use of PowerPoint affects teaching and learning, the various ways that teachers integrate this ICT tool in their settings and the challenges they address, as well as the perceptions of teachers and students alike. Nevertheless, there is no study to our knowledge till today that investigates the relation of PowerPoint use with teachers' sense of efficacy. Given the widespread use of PowerPoint presentations by educators all over the world, we set out this study in the hope that an investigation into the relationship between PowerPoint use by teachers and their sense of efficacy might inform ways to improve teaching practices and gain insight into teachers' skills development.

The following sections provide a review of research on teacher sense of efficacy and the use of PowerPoint in educational settings. Next, a description of the study context and of the methodology employed in the study is presented. There follows the presentation of results and a discussion, and, finally, in the last section, a short synopsis of the study is given.

2. TEACHER SENSE OF EFFICACY

Teacher sense of efficacy has been characterized as an elusive construct (Tschannen-Moran and Hoy, 2001) difficult to capture or define (Chong *et al.*, 2012) yet, so powerful its role is in teaching and learning that it continues to interest researchers and practitioners alike. Several studies have consistently related teacher efficacy to teacher classroom behavior and student outcomes, while it has also been associated with the effort invested in teaching, the level of aspiration, and the goals set. In an extensive review of empirical studies linked to teacher efficacy, Tschannen-Moran *et al.* (1998) concluded that teachers with a strong sense of efficacy tend to exhibit greater levels of planning, organization and enthusiasm; they are more committed to teaching and they are likely to have a positive classroom environment; they are more open to new ideas and more willing to experiment with new methods to better meet the needs of their students; they are more persistent and resilient when things do not go smoothly; they are less critical of students when they make errors; they work longer with students who are struggling and they are less inclined to refer a difficult student to special education. On the contrary, teachers with low sense of efficacy might nurture custodial control ideologies and show less trust to students, hesitance to relinquish control and reluctance to share responsibility for solving classroom problems with their students, while they are inclined to use concrete rewards to support motivation in learning (Woolfolk *et al.*, 1990).

Although the terms 'teacher sense of efficacy' and 'teacher efficacy' are used interchangeably in the literature and in this study too, the former appears to be more accurate and precise as what is being discussed is not an objective measure of actual competence, but rather a personal sense of competence. Yet, it has been found that regardless of whether teachers' beliefs and expectations are accurate – and subsequently whether they account for genuine competence - they can influence students' learning (Chouinard *et al.*, 2007).

There are numerous definitions of teacher efficacy, all relying to a greater or lesser degree upon Bandura's definition of self-efficacy (Ross *et al.*, 1996). In conceptualizing teacher efficacy broadly, Guskey and Passaro defined it as "teachers' belief or conviction that they can influence how well students learn, even those who may be considered difficult or unmotivated" (1994, p. 628). However, attention should be paid to the fact that teacher efficacy is not a stable, unitary trait, but rather a malleable one as it fluctuates over time within teachers (Ross *et al.*, 1997) and it is task, subject-matter, and context specific (Tschannen-Moran *et al.*, 1998). In other words, teacher sense of efficacy is not a decontextualized trait but the result of teachers' interaction with the combination of circumstances at a given moment. Tschannen-Moran *et al.* (1998) provided a more precise definition for teacher efficacy that accounts for teachers' perceptions of their own competence as well as their assessment of the teaching context as "the teacher's beliefs in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (p. 233). Along the same line of thought, practitioners have explored teachers' sense of efficacy within particular areas such as classroom management

(Woolfolk *et al.*, 1990) mathematics teaching (Tran *et al.*, 2012) instructional practices (Tran *et al.*, 2012) cultural context (Ho and Hau, 2004) and so on.

Despite the fact that teacher efficacy is malleable, it is by large resistant to change, especially once beliefs are established (Hoy and Spero, 2005). Tschannen-Moran *et al.* noted that “changes in efficacy beliefs among inservice teachers seem to be more difficult to produce and sustain” (1998, p. 236). Hence, experiences during the early days of teaching are possibly critical for the development of efficacy beliefs (Mulholland and Wallace, 2001; Hoy and Spero, 2005). Finally, it is reasonable to expect that efficacy levels may be lower at the onset of any instructional change and gradually increase while teachers develop strategies and techniques to cope with the changes and at the same time they monitor benefits in student learning as a result of the instructional change (Tran *et al.*, 2012).

The issue that remains to be discussed in this study is how teacher efficacy could be measured. From the inception of the construct till today, researchers have produced several instruments in their attempt to conceptualize the meaning of teacher efficacy and eventually measure it (see Tschannen-Moran and Hoy (2001) for a review of the instruments). The Ohio State Teacher Efficacy Scale (OSTES) seems to present the best available solution till now for measuring teacher efficacy as it offers a unified and stable factor structure and evaluates a wide range of teaching abilities (Tschannen-Moran and Hoy, 2001). The OSTES comprises three factors that measure teacher efficacy: efficacy for classroom management, i.e. teachers’ beliefs in their abilities to maintain classroom order; efficacy for instructional strategies, i.e. teachers’ belief in their capabilities to plan their lesson and execute appropriate teaching strategies; and efficacy for student engagement, i.e. teachers’ beliefs in their capabilities to induce motivation and promote active learning.

3. POWERPOINT USE IN TEACHING

Already counting 30 years of existence, Microsoft Office PowerPoint is by far the commonest presentation tool, its widespread use having permeated irrevocably the education world. Although it has not been developed for teaching and learning purposes, its flexibility, visual attractiveness, and the immense potential of its features has rendered it a favorite with all level education professionals around the world, an indispensable component of their instruction. While reaping the benefits of its employment, restrictions on its impact and efficiency on learning should be taken into account. Literature abounds and studies have been conducted on teachers’ and students’ attitudes towards PowerPoint presentations and facilitation of teaching and learning, mostly agreeing on its positive influence and capabilities, without underestimating the limitations and the adverse effects caused by its inappropriate use.

The use of PowerPoint has been deemed beneficial according to numerous studies and its effectiveness proved in an academic context, i.e. as a supporting and supplementary tool for lectures, as opposed to overhead transparencies, or a simple lecture (see (Szabo and Hastings, 2000; Bartsch and Cobern, 2003; Hassner, 2005; James *et al.*, 2006; Schrad, 2010; Kahraman *et al.*, 2011; Wang *et al.*, 2012)). Since a PowerPoint presentation can include multimedia features (audio, video, hyperlinks, graphs, charts, images, animation, etc.) with relative ease on the part of its competent maker who can blend efficiently verbal and visual prompts, it surely enriches the teaching repertoire and the educational process on the whole (Gunderman and Mccammack, 2010). It facilitates the orderly, coherent structuring of a lecture (Suskind, 2008) it reinforces what is being imparted, it clarifies difficult to grasp issues, it helps to illustrate better key concepts, it consolidates understanding and it supports different learning styles, catering for both the visual and the auditory learner. Its advocates claim it boosts retention (Hassner, 2005) it promotes interest and motivation (James *et al.*, 2006; Parette *et al.*, 2009; Kahraman *et al.*, 2011) and aids in strengthening the teaching effect. Numerous studies on students’ perceptions (as cited in (Szabo and Hastings, 2000; Apperson *et al.*, 2008; Suskind, 2008; Kahraman *et al.*, 2011; Hill *et al.*, 2012)) indicate that learners believe that PowerPoint facilitates learning, it makes classes more organized, clear and interesting and they even like professors better, having an overall more favorable attitude toward their education. Yet, the use of PowerPoint did

not necessarily improve their academic performance or proved to facilitate their learning according to empirical evidence from conducted studies (e.g. Susskind (2008)) while the performance scores of university students are not always higher when PowerPoint-enhanced lectures are used (studies mentioned in (James *et al.*, 2006; Burke and James, 2008; Schrad, 2010)).

As for the drawbacks of the tool, it is undoubtedly accepted that in the hands of an incompetent educator it will be misused (e.g. if reading over crammed slides with excessive bullet use), and its effects cancelled (Hassner, 2005; Harden, 2008; Gunderman and Mccammack, 2010; Cho and Lee, 2013). Attention has been drawn first of all to the unrelated graphics incorporated in the slides of a presentation which have been shown to have a negative, distractive effect on the learning outcomes as they confuse and mislead the students (Bartsch and Cobern, 2003; Kahraman *et al.*, 2011); citing other studies as well). Its critics also argue that the transition from slide to slide promotes only linear thinking (Kinchin, 2006; Kinchin and Cabot, 2007; Peters and Beeson, 2010) and does not encourage critical skills since by using bullets for example, students make the erroneous assumption that the list of points presented is exhaustive (Peters and Beeson, 2010). Moreover, it is said to foster student passivity and disengagement (Kinchin, 2006; Kinchin and Cabot, 2007; Gier and Kreiner, 2009; Kahraman *et al.*, 2011; Hill *et al.*, 2012), and leads to a decline in interaction and attendance (James *et al.*, 2006; Gier and Kreiner, 2009). Recently, the alternative software program Prezi among other presentation software programs has come into focus as offering an interactive style of nonlinear shows (Hill *et al.*, 2012) and allowing more informed choices.

The pedagogical benefits can outweigh the weaknesses and the inherent limitations of the tool can be overcome as long as the challenges are taken into consideration and catered for. In combination with other complementary tools (e.g. interactive whiteboards and tablet pen displays), interactive activities, student-centered, information-gap handouts, innovative approaches, well-constructed slides, active learning methods (e.g. concept mapping, content-based questions, questioning techniques) which have the potential to increase student involvement and counteract passivity, its strengths will be enhanced and the limitations minimized. The real challenge is how it is used and not whether it is used; it is the instructor's teaching ability that will ultimately have a positive effect on the students learning (Hardin, 2007 in Gier and Kreiner (2009)). In a rapidly changing technological environment, the effectiveness of the medium in the classroom needs to be assessed at all times, bearing in mind the feeling of efficacy for the teacher and the learning outcomes for the student.

4. HOW POWERPOINT USE MAY AFFECT TEACHER SENSE OF EFFICACY

It has been stated above that teacher sense of efficacy is malleable and context specific. Therefore, it can be assumed that it is susceptible to fluctuations depending on the quality of resources and rigidity of constraints in the specific teaching context (Hoy and Spero, 2005). Or, to put it another way, the teaching resources available and the quality of the facilities could have an impact on teachers' judgment of their capability to accomplish the teaching task in the particular context and make a difference in students' learning. Hence, for example, availability of a computer with a projector might be considered a critical resource by teachers who integrate PowerPoint in everyday instruction for the obvious reason that if they cannot gain access to it, then, they have to change their teaching plans and methods. Subsequently, this could have a negative impact upon their judgment of their capability to execute the teaching tasks and could lower their teacher efficacy. In contrast, when such obstacles are removed then, it can be presumed that teacher efficacy rises again. What we suggest here is that teachers might feel that PowerPoint facilitates their work in the class to a degree that has, at least some, impact on their teacher sense of efficacy.

5. METHODOLOGY

5.1. Participants – Context

Twenty-five in-service teachers (19 female; 6 male) enrolled in a 15-day blended professional development learning course titled: “Creating presentations with Prezi for environmental education” organized by the Environmental Education Centre of Vistonida (Greece) in April-May 2014. The focus of the course was on the development of both skills and rationale in the conception and formation of presentations for teaching subjects within the field of environmental education. Entry requirements demanded that participants have good working knowledge of PowerPoint and a reasonable level of ICT skills. All participants reported being able to handle with ease common computer tasks such as moving files to a usb stick, attaching files to an email, using text editing software, searching for files on the computer, etc., while three out of four participants reported using computers for over 1 hour every day. As regards PowerPoint knowledge, nearly half of the participants reported using PowerPoint for educational purposes at least once every week and for several subjects (mainly for history, geography, environmental education, cross-curricular subjects and Greek language), and on a scale from 1-10 (1: very difficult, 10: very easy) the typical participant considered that it is quite easy (M: 8.68; SD: 1.1) to use PowerPoint. Most participants had a large teaching experience; the average teacher in the sample had just over 12 years of teaching experience, while only three had worked for less than 6 years.

5.2. Instrument

A self-administered questionnaire was developed for the needs of the present study. The questionnaire was based on the Ohio State teacher efficacy scale (OSTES), constructed by [Tschannen-Moran and Hoy \(2001\)](#) and adapted to measure the effect of PowerPoint use in teacher efficacy. Hence, for example items 3: “*To what extent can you craft good questions for your students?*” and 16: “*How well can you establish routines to keep activities running smoothly?*” from OSTES were changed into “PowerPoint helps me craft good questions for my students” and “PowerPoint helps me establish routines to keep activities running smoothly”.

The questionnaire employed a 5-point Likert scale ranging from “not at all” to “very much” and an extra “I don't know/Not applicable” response to each question. The long form of OSTES consists of 24 items loaded on three factors, which are Efficacy for Instructional Strategies, Efficacy for Classroom Management, and Efficacy for Student Engagement. We modified all items of OSTES as aforementioned, but we omitted 3 items as they were not appropriate for the context of our study (e.g. “PowerPoint helps me assist families in helping their children do well in school”). Therefore the first version of the questionnaire contained 21 items. To assess and ensure the content validity of the questionnaire, we asked the opinion of three experienced teachers who use PowerPoint in their daily teaching practices. Based on their answers seven items were omitted from the first version as they were deemed irrelevant to the use of PowerPoint in classroom settings, two additional items were included (“PowerPoint helps me design and organize better my lesson”, “PowerPoint helps me get students to collaborate”), and three were rephrased. The final version of the questionnaire contains 16 items, seven in the first factor, four in the second factor, five in the last factor, and it is presented in Table 1.

6. RESULTS

Data obtained from the questionnaire were examined to investigate teachers' perception about the effect of PowerPoint use in their sense of efficacy. Frequencies, means and standard deviations were calculated for each question on the questionnaire (see Table 1).

Table-1. Frequencies, means and standard deviations on each item of the questionnaire

Items	Not at all	A little	Somewhat	Much	Very much	I do not know/Not applicable	M	SD
PowerPoint helps me gauge student comprehension of the lesson	3	2	7	9	3	1	3.29	1.20
PowerPoint helps me adjust my lessons to the proper level for individual students	0	3	4	8	10	0	4.00	1.04
PowerPoint helps me provide an alternative explanation or example when students are confused	2	0	4	11	6	2	3.83	1.11
PowerPoint helps me design and organise better my lesson	0	0	2	6	17	0	4.60	0.65
PowerPoint helps me craft good questions for my students	3	1	10	6	5	0	3.36	1.22
PowerPoint helps me implement alternative strategies in my classroom	0	1	4	11	9	0	4.12	0.83
PowerPoint helps me respond to difficult questions from my students	5	1	13	3	2	1	2.83	1.17
PowerPoint helps me establish routines to keep activities running smoothly	2	3	5	7	8	0	3.64	1.29
PowerPoint helps me get students to collaborate	3	5	5	8	4	0	3.20	1.29
PowerPoint helps me continue the lesson despite the disruptive behavior of some students	5	4	6	5	3	2	2.87	1.36
PowerPoint helps me prevent students' disruptive behavior in the class	1	3	11	6	3	1	3.29	1.00
PowerPoint helps me motivate students for lessons	0	0	4	8	13	0	4.36	0.76
PowerPoint helps me improve students' memory of what they have been taught in previous lessons	0	1	3	11	8	2	4.13	0.82
PowerPoint helps me improve the understanding of a student who is failing	0	2	1	11	9	2	4.17	0.89
PowerPoint helps me develop critical thinking in students	2	1	4	12	4	2	3.65	1.11
PowerPoint helps me foster student creativity	4	2	2	10	4	3	3.36	1.40

Source: Adapted from the OSTES (Tschannen-Moran and Hoy, 2001).

As seen in Table 1, participants generally expressed a favorable view as regards the value of PowerPoint in their teaching practice. In the following paragraphs their responses are analysed in more detail according to the three factors of teacher sense of efficacy.

6.1. Efficacy for Instructional Strategies

Seven items of the questionnaire related to teacher efficacy for instructional strategies and the use of PowerPoint. Participants maintain that PowerPoint helps them very much to design and organize their lesson ($M=4.60$; $SD=0.65$); much to implement alternative strategies ($M=4.12$; $SD=0.83$), adjust lessons to the proper level for individual students ($M=4.00$; $SD=1.04$), and provide an alternative explanation or example when students are confused ($M=3.83$; $SD=1.11$); somewhat to craft good questions for their students ($M=3.36$; $SD=1.22$), gauge student comprehension of the lesson ($M=3.29$; $SD=1.20$), and respond to difficult questions from their students ($M=2.83$; $SD=1.17$).

6.2. Efficacy for Classroom Management

Four items of the questionnaire related to teacher efficacy for classroom management and the use of PowerPoint. Participants appreciate that PowerPoint helps them much to establish routines to keep activities running smoothly ($M=3.64$; $SD=1.29$); somewhat to prevent students' disruptive behavior in the class ($M=3.29$; $SD=1.00$), get students to collaborate ($M=3.20$; $SD=1.29$), and continue the lesson despite the disruptive behavior of some students ($M=2.87$; $SD=1.36$).

6.3. Efficacy for Student Engagement

Five items of the questionnaire related to teacher efficacy for student engagement and the use of PowerPoint. Participants appreciate that PowerPoint helps them much to motivate students for lessons ($M=4.36$; $SD=0.76$), improve the understanding of a student who is failing ($M=4.17$; $SD=0.89$), improve students' memory of what they have been taught in previous lessons ($M=4.13$; $SD=0.82$), develop critical thinking in students ($M=3.65$; $SD=1.11$); somewhat to foster student creativity ($M=3.36$; $SD=1.40$).

7. DISCUSSION

The results from this study provide evidence that PowerPoint use in the classroom has a general positive impact on teacher sense of efficacy. PowerPoint use has been appraised positively in all three factors of teacher sense of efficacy as postulated in the OSTES, which are Efficacy for Instructional Strategies, Efficacy for Classroom Management, and Efficacy for Student Engagement.

PowerPoint supports teachers' efforts to structure the presentation in a professional manner (Hashemi *et al.*, 2012) and, right from the onset, teachers employ PowerPoint to design the lesson in an efficient and effective manner and organize the content of the lesson in a logical and coherent way (Tang and Austin, 2009; Hill *et al.*, 2012). Although PowerPoint is employed first and foremost for lecturing, the tool itself allows for freedom of action and implementation of alternative teaching strategies (e.g. Pauw (2002)). Unlike traditional slides, PowerPoint slides can be easily accessed in any sequence in class allowing teachers to refer smoothly back to previous slides during the lesson and respond to difficult questions from their students, provide an alternative explanation when students are confused (James *et al.*, 2006) and measure student comprehension of the lesson. By integrating multimedia in PowerPoint slides, teachers have more and richer means to craft good questions for their students. What is more, by using a mixture of media teachers can reach a wide range of learners and cater for a variety of learning styles (Hashemi *et al.*, 2012; Hill *et al.*, 2012) while slides can be easily edited to adjust lessons to the proper level for individual students (Gray *et al.*, 2005). PowerPoint can also serve as a roadmap (Hashemi *et al.*, 2012) and, thus, help establish routines in classroom. This also helps to improve teaching performance, causes the flow of information in class to be less disrupted and, eventually, facilitates classroom management (James *et al.*, 2006; Hill *et al.*, 2012).

When students are asked about the use of PowerPoint in education, they generally agree that it makes the courses more interesting and enjoyable (James *et al.*, 2006; Tang and Austin, 2009; Hill *et al.*, 2012) holding their attention and, thus, preventing students' disruptive behavior. Students also express the belief that PowerPoint use increases their motivation for learning (Tang and Austin, 2009) and it enhances their actual learning by helping them to remember and understand the materials (James *et al.*, 2006; Tang and Austin, 2009). The above findings add to the view that PowerPoint can be an effective instructional medium for delivering information and subsequently it enhances teaching performance and efficacy.

To sum up, the results of the study are promising in that they open up a new area of research on investigating how teacher sense of efficacy is affected by the use of ICT tools.

8. LIMITATIONS

The use of the questionnaire has several limitations that should be considered. First, the questionnaire developed here is crude and has not been validated in the general population and in the Greek language. Second, the data collected for this survey reflect the views of in-service teachers of primary education and cannot be generalized well to other education levels. Third, the participating teachers were positively predisposed in using presentation techniques in their working routine since they applied for a course on this topic. Hence, the results may vary when the questionnaire addresses a broader teacher population. Thus, a qualitative approach is needed to gain a better understanding of how PowerPoint use affects teacher efficacy.

9. CONCLUSION

The digital revolution has invaded the classroom transforming the learning environment and changing the ways of instruction. Although the growing body of research into teacher sense of efficacy has consistently related it to the ability to deliver academic instruction and to create an adequate learning environment, the impact of technology use into teachers' sense of efficacy has not been examined. In this study we adapted a self-administered questionnaire to measure the effect of PowerPoint use in teacher efficacy. Participants in the study were 25 experienced in-service teachers who employ PowerPoint in their teaching on a frequent basis. According to their answers, they conclude that PowerPoint use affects positively their teacher sense of efficacy. Although there are several limitations in the study, the results are significant because they open up a new area of investigation into how teacher sense of efficacy is affected by the use of ICT tools by teachers.

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